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ARMY GREATEST INVENTIONS – CY 2009 PROGRAM
MRAP Overhead Wire Mitigation (OWM) Kit

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ARMY GREATEST INVENTIONS CY 2009

1. Nomination Title: MRAP Overhead Wire Mitigation (OWM) kit

2. Submitting Organization: U.S. Army Research, Development and Engineering Command (RDECOM)
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4. Fielding Date:
The first 600 OWM kits were delivered to the MRAP retrofit location in Balad, Iraq in June 2009 and are continuing to be manufactured and fielded to multiple locations throughout Iraq.

5. Invention Description:

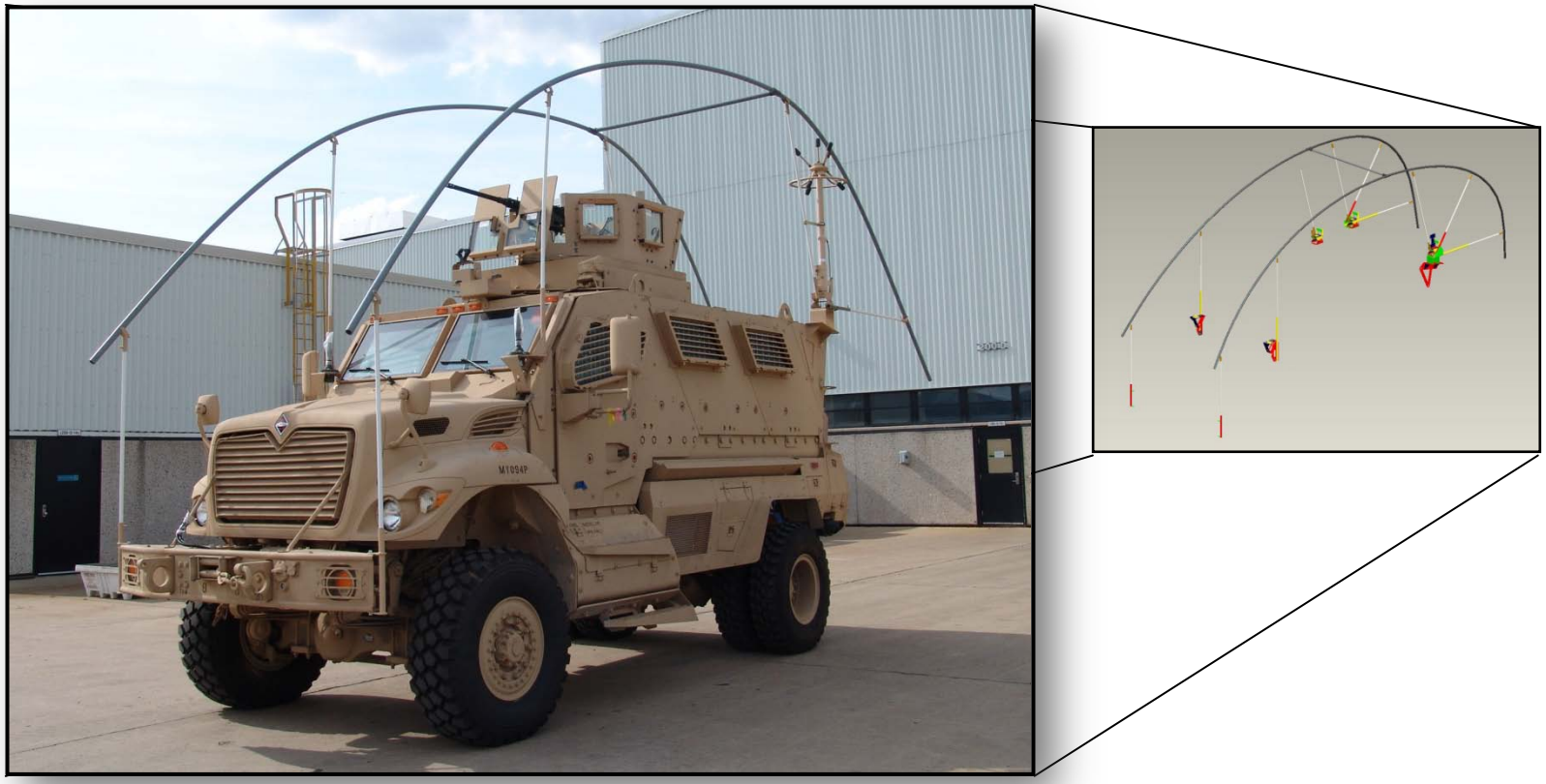
THE BACKGROUND:

Soldiers operating in urban areas frequently made contact with low hanging high-voltage lines due to the excessive height of their MRAP vehicles. This created a dangerous operational and safety issue with the potential to electrocute the crew and destroy sensitive onboard electronics. Wires and cables strung across the road were frequently torn down completely, severely damaging the infrastructure and aggravating the local population. This worked against our objective of winning the hearts and minds of the Iraqi people, who often lost power, telephone and even laundry to our patrol vehicles.

THE SOLUTION:

In response to these pressing issues, and inspired by the ingenuity of Soldier-created solutions in theater, RDECOM-TARDEC developed the objective MRAP Overhead Wire Mitigation (OWM) kit designed to guide low-hanging wires safely up and over the tall MRAP vehicles. To date, RDECOM-TARDEC has designed OWM kits for several MRAP variants and has guided the development ofadditional variants at the Naval Surface Warfare Center (NSWC) in Dahlgren, VA. RDECOM-TARDEC has worked extensively with the Soldiers in theater and across the Department of Defense throughout the development process to ensure that the best possible product is delivered to the Warfighter.

The OWM kit is an essential element of MRAP operations in urban environments - It protects the crew and their sensitive electronic equipment from electrocution and prevents damage to the local infrastructure due to MRAP patrols.



THE DETAILS:

MRAP Overhead Wire Mitigation is:

- **Effective** - The OWM kit has been validated both at RDECOM-TARDEC and the Aberdeen Proving Ground (APG) for its ability to effectively travel through low-hanging wires. These kits have been proven to clear multiple thicknesses of wires as low as 8 feet off the ground, at speeds of up to 35 mph.

- **Safe** - The OWM kit has been validated both at RDECOM-TARDEC and APG for safety of use and installation. The materials have been carefully selected to ensure non-conductivity and RF transparency, preventing electrocution and interference with the onboard jamming equipment.

- **Easy to install and repair** - The OWM kit was designed for simplicity from the ground up. Intended to be a retrofit kit, the installation of the OWM requires no permanent modification to the vehicle and can be installed/repaired in the field without the use of special tools.

- **Easy to Support** - The OWM kit has over 70% commonality between variants, leading to a lower logistical burden of spares and greater overall availability. In the event of a firefight, the kit can be shot through and repaired later with bulk-shipped off-the-shelf replacement components.

- **Durable** - Each OWM variant has successfully run over 1000 miles of off-road testing to ensure extended durability in theater.

- **Flexible** - Each OWM kit comes with specially-designed tilt-down mounts for the antennas. When the OWM kit guide rails are installed, the mounts act as structural support. If the guide rails are removed, the mounts provide full tilt-down capability to the antennas for mobility under low, rigid obstacles such as overpasses and bay doors.

- **Adaptable -** The OWM kit was designed to accommodate future technologies and can be expanded to protect newly-integrated systems such as the Remote Weapons Station (RWS) and the Boomerang sniper detection system.

6. Impact on Army Capabilities:

Currently, all MRAP vehicles operating outside the wire in Iraq are required to have a wire-clearing device installed on their vehicle. To date, over 3,000 objective OWM kits have been fielded to units across Iraq, with an additional 900 scheduled to be manufactured and fielded by October 2010. Without a doubt, the RDECOM-TARDEC OWM is having a lasting and significant impact on urban operations and continues to provide protection and greater mobility for our Warfighters.

The OWM kit provides the following critical capabilities:

- Increased survivability for our Warfighters, especially the gunners – The OWM kit prevents the electrocution of our soldiers by low-hanging high-voltage lines and helps make it safer to operate in urban areas.

- Increased protection of onboard equipment – The OWM kit prevents electrical lines from shorting through the vehicle, causing severe damage to all onboard electronics.

- Enhanced mobility of MRAP vehicles – The OWM kit has been shown to safely clears wires as low as 8 ft. at up to 35 mph. Additionally, it protects the vehicle while in reverse, giving the operator a full range of mobility options even when directly under wires.

- Greater ability to win the hearts and minds of the Iraqi people- The high profile of the OWM kit makes a bold statement to the local population, and shows intent to preserve their existing infrastructure.

- Adaptability to new types of vehicles – The design process for adapting the OWM kit to new vehicles has been greatly refined and can be easily applied to other vehicles such as the MRAP All-Terrain Vehicle (MATV) or the Family of Medium Tactical Vehicles (FMTV)

7. Potential Benefits Outside the Army:

- In addition to Army vehicles, the RDECOM-TARDEC OWM kit is designed to be used on U.S. Navy, Marine Corps and Air Force MRAP variants.
- The OWM kit is also adaptable to many different types of vehicles across the DOD that may operate in urban areas.

8. Inventiveness:

As the use of MRAP vehicles increased, so did the need for protective technologies such as the OWM. Adapting to operations in urban environments, many units created their own make-shift wire-clearing kits as a stop-gap measure until the fielding of the objective OWM kit. There were serious shortcomings with these early kits however, that RDECOM-TARDEC sought to address with the objective OWM kit. During the OWM development process, RDECOM-TARDEC also played a critical role in providing the Soldiers with best practices for the construction of make-shift kits, further helping to ensure their safety.

The OWM kit incorporates many features not seen in the make-shift kits that ensure safe, effective operation:

- Non-conductive supports and guide rails – The OWM kit uses non-conductive fiberglass and CPVC tubing to guide live wires over the vehicle. This ensures the high-voltage line does not ground out through the vehicle, endangering the crew and equipment.
- RF-transparent materials – The materials chosen for the OWM kit have been carefully selected to ensure minimal interference with on-board communication and jamming equipment.
- Double-sided – The OWM kit provides two guide rails over the vehicle to ensure complete protection, even when approaching wires at an oblique angle.
- Reverse operation – The OWM kit provides protection in both the forward and reverse direction to provide protection and mobility even in the confined spaces of an urban environment.
- No-weld – All OWM kit variants use existing bolt holes on the vehicle and do not require welding or special tools for installation or repair.
- Room to grow –The OWM kit is expandable to accommodate new technologies without the need for new parts.
- Off-the-shelf-components – The high-wear components of the OWM kit are easily replaced with bulk-shipped off-the-shelf components.
- Collapsible antennas – Each OWM kit comes with a set of tilt-down brackets for the hard-mounted antennas, giving the MRAP crew even more mobility options underneath low, rigid obstacles such as overpasses.